U.S. PATENT APPLICATION

FOR

A TOOTHPICK FOR LIGHT TREATMENT OF BODY STRUCTURES

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FIELD OF THE INVENTION

This invention relates generally to toothpicks. More particularly, the present invention relates to toothpicks capable of providing hygienic effects.

BACKGROUND

In general, hygiene relates to the principles of cleanliness, promotion and preservation of health or the freeing from disease-causing microorganisms. Hygienic effects can be established in different ways of which one is through the effect of light on biological structures. For instance, the hygienic effect of visible, near ultraviolet and infrared light on

biological structures is known and has been described to provide anti-inflammatory effects, preventative effects, caries-protective effects, heating effects, anti-bacterial effects, sterilizing effects, cleaning effects, cosmetic effects, therapeutic effects, healing effects, bio-stimulative effects, bio-altering effects, pain-releaving effects, agent-penetrating effects, photo-rejunivating effects and photo-dynamic treatment effects (See for instance a book by *Goldman* (1981) entitled "*The biomedical laser: technology and clinical applications*" and published by Springer-Verlag, New York; a book by *Katzir* (1993) entitled "*Lasers and optical fibers in medicine*" and published by Academic Press, New York; a book by *Hajder* et al. (1994) entitled "*Acupuncture and lasers*" and published by Ming, Belgrade; a book by *Tuner* et al. (1996) entitled "*Laser therapy in dentistry and medicine*" and published by Prisma Books, Grangesberg, Sweden; a book by *Alster* et al. (1996) entitled "*Cosmetic laser surgery*" and published by Wiley & Sons, New York; or a book by *Fitzpatrick* et al. (2000) entitled "*Cosmetic Laser Surgery*" and published by Mosby, St. Louis). The effects of a laser light on biological structures is dependent on the laser properties (active matter, beam wavelength, continuous or impulse mode of operation), characteristics of the structures, water content, pigmentation degree, vascularization, vitality, heterogeneity, specific heat conductivity or time exposure. The photo-effect of a laser can be applied to superficial structures and subcutaneous structures. As far as the mechanisms of laser radiation effects are concerned, they may be thermal, mechanical or chemical.

When it comes to oral hygiene, the art teaches a wide variety of toothpicks in various shapes. Generally, a toothpick is a small pointed piece of wood or plastic for removing

substances. Toothpicks are especially known to remove food particles from between the teeth. In this sense toothpicks contribute to the overall hygiene of a person's oral cavity and in particular the teeth. However, the use of such toothpicks would not necessarily prevent that person from diseases or health deterioration of the structures in an oral cavity. More generally, a toothpick would not be able to provide hygienic effects that could be provided by the application of light. Accordingly, there is a need for new toothpicks that would be able to provide a more comprehensive application of hygienic effects to oral cavities and body cavities in general.

SUMMARY OF THE INVENTION

The present invention provides a toothpick for light treatment at a body structure. The toothpick distinguishes a handle and an element. The toothpick could be developed as one single piece. However, the toothpick could also be developed with removable, disposable, reusable or replaceable parts, i.e. for instance the handle and/or element. The handle hosts one or more light sources each capable of delivering a light beam with a unique light treatment. The element is optically connected to the light source(s) such that the light beam(s) could radiate through the surface of the element at a body structure. This radiation is not limited to radiation through the tip of the element, but would radiate in multiple directions.

In one aspect, the element is a transparent element and the light beam radiates substantially through the entire surface of the transparent element. In another aspect, the element is a

non-transparent element and optical guides could then be included within the element in such a way that the radiation of the light beam passes the surface of the element in multiple directions. In yet another aspect, the element could be a transparent element with optical guides whereby the optical guides promote the propagation of the light beam through the transparent element. In still another aspect, the element could include optical components (e.g. reflective grooves) to promote the propagation of the light beam.

The element could take different shapes. In one aspect, the element is slender and elongated. For instance, the element could be tapered or cone-shaped. In another aspect, the element could include different shapes, the selection which could be dependent on for instance the desired appearance of the toothpick, preference by the user or manufacturer, and/or type of application (e.g. area of treatment or location of treatment). Examples of such shapes are a bead-shape at the tip of the element or a flat shaped head. In another aspect, the element could have texture (e.g. ribbed surface or a bubbled surface) or could have bristles. The texture or bristles could be transparent to the selected light beam, could include one or more optical guides, or could be non-transparent. The element could also be made out of material(s) that is (are) bendable or formable. The element could be developed with a pre-arranged angle or if bendable or formable material(s) is (are) used then the user could manipulate the element to create any desired angle of the element.

The light source could be a low power laser, a light emitting diode or a semiconductor laser to provide a light beam from the ultraviolet, visible or infrared spectrum. The types of light

treatments that could be selected could include any of the following effects, such as an anti-inflammatory effect, a preventative effect, an anti-bacterial effect, a sterilizing effect, a heating effect, a caries-protective effect, a cleaning effect, a cosmetic effect, a therapeutic effect, a healing effect, a bio-stimulative effect, a bio-altering effect, a pain-releaving effect, an agent penetrating effect, a photo-rejuvinating effect, a photo-dynamic treatment effect or a tissue stimulating effect. The light source could be controlled in a pulsed manner and a continuous manner. It would also be possible to control one or more parameters of the light source and therewith the light treatment. Examples of how such a light treatment could be changed or updated are discussed.

The element of the toothpick could be used in direct or not in direct contact with a body surface as long as the light treatment can be applied to the body structure. In case the element is in contact with a body structure, then the element could add a massaging effect to the body structure. In addition, the toothpick could include different kinds of massaging means. For instance, the texture, the different shapes or the bristles could contribute to this massaging effect. Furthermore, the toothpick could include a vibrating means to add a massaging effect.

In one variation, the toothpick could be combined with a floss, e.g. a dental floss, that could be (removable, disposable, reusable or replaceable) attached to the handle. In one aspect the floss could be a transparent floss, which is optically connected to a light source to radiate a light beam with a selected light treatment through the transparent floss at a body

structure. In another variation an agent could be used and applied to the body structure before, during or after the application of the light treatment. Such agents could work as a catalyst, soother or enhancer to the body structure.

BRIEF DESCRIPTION OF THE FIGURES

The objectives and advantages of the present invention will be understood by reading the following detailed description in conjunction with the drawings, in which:

FIG. 1 shows examples of applying hygienic effects to body structures in a quasi-stationary manner according to the present invention;

FIGS. 2-3 shows examples of applying hygienic effects to body structures in a dynamic manner according to the present invention;

FIG. 4 shows an example of a toothpick according to the present invention;

FIG. 5 shows an example of an assembled toothpick according to the present invention;

FIG. 6 shows an example of a toothpick with an angled element according to the present invention;

FIG. 7 shows an example of a toothpick with a bead shape tip according to the present invention;

FIG. 8 shows a toothpick with a flat shaped head according to the present invention;

FIGS. 9-10 show examples of elements with optical components according to the present invention;

FIG. 11 shows elements with a textured surface or bristles according to the present invention;

FIG. 12 shows a toothpick with vibration means according to the present invention

FIG. 13 shows a toothpick with multiple light sources according to the present invention;

FIG. 14 shows a toothpick stored in a cradle according to the present invention;

FIG. 15 shows a toothpick stored in a cradle communicating with hygienic service providers according to the present invention; and

FIG. 16 shows a toothpick with a floss according to the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Although the following detailed description contains many specifics for the purposes of illustration, anyone of ordinary skill in the art will readily appreciate that many variations and alterations to the following exemplary details are within the scope of the invention. Accordingly, the following preferred embodiment of the invention is set forth without any loss of generality to, and without imposing limitations upon, the claimed invention.

The present invention provides a toothpick capable of applying one or more light treatments to body structures. These light treatments are established by one or more light sources each capable of delivering a light beam with a unique light treatment to the body structures. The application of the light treatments could be established either in a quasi-

stationary manner or a dynamic manner. The light sources are preferably low power light sources including low power lasers, light emitting diodes or low power semiconductor lasers (See, for instance, the following companies which are listed for purposes of illustration and should not be regarded as limiting to the invention: *Coherent Inc., Santa Clara, CA*; *Microlasers by PolyScientific Inc., Blackbury, VA*; *Photonic Products, Bishops Stortford, United Kingdom*; Organic LEDs by *Covion Organic Semiconductors GmbH, Frankfurt, Germany*; Blue light emission from porous silicon by *University of Science and Technology of China in Hefei*). The desired light treatment(s) that one would like to obtain guides the choice of the light source (light sources) and the parameter(s). By varying parameters such as e.g. fluence, spot size, mode such as continuous or pulsed, repetition rate, pulse duration different light treatments could be established.

A body structure is defined as any body structure that was created in a natural way, created in an unhealthy way or created in an unnatural way. Examples of naturally created body structures for which the toothpick of the present invention could be useful are the oral system or mouth, a nasal system or nose, an ear, a vaginal system, uterus or a rectal system. Examples of an unhealthy created body structure for which the toothpick of the present invention could be useful are body structures that are caused by disease or infections. Examples of unnaturally created body structures for which the toothpick of the present invention could be useful are open wounds, gunshot wounds that created a structure, open wounds inflicted by physical assault, burns that created a structure, or surgically created body structures, including body structures created with an endoscope. A surgically created

body structure is, for instance, created by an incision through the skin such that the skin opening provides access to subcutaneous body structures that might require hygienic treatment. Examples of surgically accessible body structures include the cardio-vascular system, intestinal system, organs, or any other body structures surrounding the organs or functional systems. Body structures encompass any type of microorganism (including disease-causing microorganisms), cell layers, tissues, organs, teeth or materials as well as any type of non-biological materials that are present in a body structure including fillings, braces, medical assistive devices, medical preventive devices, or the like.

In general, light treatments are defined as treatments with hygienic effects that relate to the cleanliness of these structures, promotion and preservation of health of the structures, freeing the body structure from disease-causing microorganisms or providing therapeutic effects. In particular, the present invention encompasses hygienic effects related to the hygienic effect of visible, near ultraviolet and infrared light on these structures, which are known in the art (for a light spectrum refer to page 13 in a book by *Tuner* et al. (1996) entitled "*Laser therapy in dentistry and medicine*" and published by Prisma Books, Grangesberg, Sweden). Examples of such hygienic effects that could be selected include anti-inflammatory effects, preventative effects, caries-protective effects, heating effects anti-bacterial effects, sterilizing effects, cleaning effects, cosmetic effects, therapeutic effects, healing effects, bio-stimulative effects, bio-altering effects, pain-releaving effects, teeth whitening effects, photo-rejuvination effects, photodynamic effects or agent-penetration effects.

To establish a particular hygienic effect at a body structure one needs to consider the light source properties such as the type of low power light source, wavelength of the light beam, the continuous or impulse mode of operation of the light sources, characteristics of the structures, water content of the structures, pigmentation degree of the structures, vascularization of the structures, vitality of the structures, heterogeneity of the structures, specific heat conductivity of the structures, the fluence of light penetration through a structure or the time exposure needed for the light beam. The art provides teachings on hygienic photo-effects of structures including guidelines regarding parameters such as the type of light source, selection of wavelength(s), fluence, penetration, selection of spot size, recommended pulse duration, recommended repetition rate, or the like. The selection of the hygienic effect as part of the present invention incorporates these teachings as well as new teachings that become available in the art describing newly identified hygienic effects.

Currently available teachings are described in the following books, which provide an exemplary list rather than a comprehensive list. The list includes a book by *Goldman* (1981) entitled "*The biomedical laser: technology and clinical applications*" and published by Springer-Verlag, New York; a book by *Katzir* (1993) entitled "*Lasers and optical fibers in medicine*" and published by Academic Press, New York; a book by *Hajder* et al. (1994) entitled "*Acupuncture and lasers*" and published by Ming, Belgrade; a book by *Tuner* et al. (1996) entitled "*Laser therapy in dentistry and medicine*" and published by Prisma Books, Grangesberg, Sweden; a book by *Alster* et al. (1996) entitled "*Cosmetic laser surgery*" and

published by Wiley & Sons, New York; or a book by *Fitzpatrick* et al. (2000) entitled "*Cosmetic Laser Surgery*" and published by Mosby, St. Louis).

FIG. 1 shows a first exemplary embodiment of a light source **110** delivering a light beam with a green wavelength **112**. The green wavelength **112** provides a unique hygienic effect when applied to body structure **120**. In this example, light beam **112** has a fairly superficial hygienic effect at body structure **120** as shown by **114**. In general, one or more light sources could be used such as n light sources **130-1** to **130-n**. Two of the same light sources could be used such as two light sources **140-1**, **140-2** that each deliver blue light, however, with at least one different parameter to establish a different and unique hygienic effect for each of the two light sources **140-1**, **140-2**. Such a different and unique hygienic effect could be established by different fluences for each of the two light sources **140-1**, **140-2**, i.e. **fluence 1** and **fluence 2**, respectively. The relative subsurface fluence of a light beam in a structure is dependent on the spot size, which could be relatively small or relatively large. The same subsurface fluence values appear at deeper levels with the larger spot size compared to the smaller spot size. Another example is that there are three light sources, of which two are the same **150-1**, **150-2** and one **150-3** is different, though all three delivering a unique hygienic effect.

FIG. 1 shows an exemplary embodiment of different hygienic effects in a structure in which the light beams are applied in a quasi-stationary manner. **FIGS. 2-3** show exemplary embodiments of the application of hygienic effects in a dynamic manner. Movement **210**

of light sources **220, 230** concurrently applies light beam **222, 232** with respectively hygienic effects **224, 234** to different locations at body structure **240** to achieve blending of these two unique hygienic effects at these different locations; **250** is an example of a blended hygienic effect of light beams **222, 232** as a result of movement **210**, which is a blend at body structure **240** of blue and green light.

Movement **310** of light sources **320, 330** concurrently applies light beam **322, 332** with respectively the hygienic effects **324, 334** to different layers **342, 344** at body structure **340** to achieve blending of these two unique hygienic effects at the different locations where some of the areas of penetration overlap; **350** is an example of a blended hygienic effect of light beams **322, 332** as a result of movement **310**, which is a blend at body structure **340** of red and green light. Note that there are areas where the hygienic effects do not blend together due to different penetration areas, though these hygienic effects are applied in a concurrent fashion. The movement relative to the body structures is not limited to movement **210, 310** (i.e. **Z** translation), but could be applied in **X**, **Y**, or **Z** direction (translation/rotation).

FIGS. 4-5 show examples of a toothpick **400** that includes a handle **410** and an element **420**. Handle **410** hosts a light source **430**, which is capable of delivering a light beam **440**. Light source **430** is powered by a power supply **450**, such as a (rechargeable) battery. Power supply **450** is connected to a switch **460**. Switch **460** is preferably positioned at the

outside of handle **410** (e.g. at a side or bottom) and controls the on/off stage of power supply **450** and therewith the on/off stage of light source **430**.

Element **420** is optically connected to light source **430**. In the example of **FIG. 4**, element **420** is a slender and elongated element. Element could be between 1-5 mm in diameter and between 10 and 80 mm in length. In one aspect element could be made out of transparent material (indicated by the slanted lines in element **410**). The transparent material should be capable of propagating the light beam **440** through its body and pass its surface. This would allow the light beam to radiate in various different directions (indicated by the arrows **440**). Light beam is not limited to a linear path with respect to the output direction of the light source (indicated by the dashed line), which would only output the light beam through the tip **422** of element **420**. Once illuminated, element **420** becomes a glowing element that radiates a selected light treatment. Generally speaking, the light beam radiates substantially through the entire surface of the transparent element and could be used at a distance or in direct contact with a body structure.

Transparent materials suitable for element **420** are materials capable of radiating a selected light beam **440** through the surface of element **420** without loosing the desired treatment effect or power of the light beam. Examples of such a transparent material are for instance, but not limited to, a silicone, a (soft) plastic, a latex, or the like.

In one aspect, handle **410** and element **420** could be two separate parts of toothpick **400**, which could be removably attached through an attachment means **470**. Such an attachment means **470** could be any type of mechanism known in the art that would not obstruct the optical connection or propagation of the light beam and could be a screw-type connection, a male-female connection, a click connection, or the like. Handle and/or element could be used as a disposable resuasable or replacable element(s). For instance, the element could be replaced with a new element, different style element or a different shape element. Instead of two separate parts, the toothpick could also be manufactured as a single device with a permanent connection between the handle and the element.

The handle could take any shape and is not limited to the shape of handle **410** as shown in **FIG. 4**. However, it would be preferred to have an ergonomically shaped handle that easily fits a user's hand. Different shapes and sizes of handles would then accommodate the shapes and sizes of the hands of children and adults.

FIGS. 4-5 show the shape of the element in a tapered shape or cone shape. However, as a person of average skill in the art would readily appreciate, the shape of the element could be changed or varied. The shape of the element could either be pre-arranged or formed due to the flexibility of the material of the element. The choice of the shape or shape changes of the element could be driven by a desired appearance of the toothpick, preference by the user or manufacturer, and/or type of application (e.g. area of treatment or location of treatment). **FIG. 6** shows an example of a toothpick **600** with a handle **610** and an element

620, whereby element **620** could have a pre-arranged angle **630** or the angular position **630** could be formed by bending or shaping element **620**. Switch **640** could be used to control the light source as discussed *supra*. However, in another aspect switch **640** might control the angular position of the element through for instance a heating mechanism, shape memory alloys, mechanical means, or the like. **FIG. 7** shows an example of a toothpick **700** with a handle **710** and an element **720**, whereby element **720** includes a bead shape **730** at the tip of element **720**. The radiation of light beams **740** will now pass through element including through bead shape **730**. **FIG. 8** shows an example of a toothpick **800** with a handle **810** and an element **820**, whereby element **820** includes a flat shaped head **830** towards the end of element **820**. The radiation of light beams **840** will now pass through element including through flat shaped head **830**. Different shapes or heads could be developed with different sizes and as discussed *infra* with different texture, all which are primarily dependent on the type of application and/or user preference. The size of these additional shapes could alter the dimensions discussed *supra* with reference to **FIGS. 4-5**.

The inside of element could include one or more optical components to direct and propagate a light beam through a transparent element and through the surface of that element. As a person of average skill in the art to which this invention pertains would readily appreciate, this could be accomplished in different ways. For instance, one could include optical guide(s) or path(s), optical fiber(s), lens(es), mirror(s), prism(s), reflective coating(s), reflective groove(s), beam splitter(s), collimator(s), light channel(s) and grating(s). In the example of **FIG. 9**, transparent element **910** includes reflective grooves **920** to promote the propagation of light beam in such a way that it is able to pass through

transparent element **910** in various directions (slanted lines indicate a transparent element as shown by element **910**, **930**). Transparent element **930** shows an example of a single optical guide **940** from which the light beam radiates outward in various directions through the transparent element **930**. An optical guide could be a hollow guide (air filled) or a guide filled with a material (e.g. water, a gel or a silicone) that optically guides a light beam and propagates the light beam through the transparent element. **FIG. 10** shows an example of an element **1010** with a flat shaped head that includes multiple optical guides **1012** integrated with a transparent element (slanted lines indicate a transparent element). Element **1020** is an example whereby multiple optical guides **1022** open up **1024** through the surface of element **1020**. Note that the material of element **1020** is not transparent and therefore the light beam passes only through openings **1024** of optical guides **1022** at a body surface. The element could therefore include various openings positioned anywhere over the surface of the element.

It has been shown that effect of radiation is improved in combination with massaging the tissue. Pressuring alive soft tissue causes an increase in its transparacy thereby providing for better penetration of the radiation (See *GA Askaryan (1982)* in a paper entitled "*The increasing of transmission of laser and other radiation through the sift turbid physical and biological media*" and published in "*Kvantovaya Electronika, V9(N7):1370-1383*). The present invention generalizes this concept. Accordingly, the present invention could include a massaging means to massage the body structure(s) and improve the transparency to the light beams. A first aspect of applying a massaging means relates to the movement

of the element or the pressure of the element against the body structures will apply a massaging effect.

In a second aspect, adding texture or bristles to the surface of the element could provide a massaging means. **FIG. 11** shows examples in which element **1110** includes a ribbed surface **1112**, element **1120** includes a bubbled surface **1122**, and element **1130** includes bristles **1132**. In light of the discussion *supra* with regards to transparent or non-transparent material for the element, each added texture or bristle could have openings or optical guides or openings **1114**, **1124**, **1134** to allow passage of the light beam through ribbed element **1116**, bubbled element **1126**, bristle **1136**, respectively. Furthermore, the ribbed element, bubble element or bristle could also be transparent to the selected light beam.

The texture or bristles could be positioned in any position or direction with respect to the handle. For instance, bristles could be positioned more or less perpendicular to the element or bristles could be positioned under an angle with respect to the element. The direction of the texture or bristles could depend on the type or shape of the element or the type of massaging effect that would be desired. The type and size of texture or bristles is dependent on the type of body structure. It would however be preferred to have soft texture or bristles that do not irritate or damage the body structures. However, in another aspect it might be desired to have firm texture or bristles. The bristles could for instance be made

out of nylon, soft fiber, or any synthetic blend. Using the texture or bristles to add a massaging effect is accomplished in a similar fashion as a toothbrush or a brush.

In another aspect, the massaging means of the present invention could include be a vibrating means to massage body the structures. Examples of such a vibrating means that could be used are an ultrasonic means, a piezoelectric means or a mechanical means. Such vibrating means are known in the art. **FIG. 12** shows a handle **1200** with a vibrating means **1210**. Since vibrating means **1210** is positioned against the inner edge **1220** of handle **1200**, the entire handle **1200** might vibrate. It would also be feasible to position a vibrating means **1230** inside the element **1240**; however in this case one needs to make sure that such a vibrating means would get in the way of the light beam path. In yet another aspect, vibrating means **1230** could be connected to the bristles **1250** or even the texture, i.e. to vibrate the bristles or texture to provide an additional massaging effect to the massaging effect established by the bristles through movement as described *supra*.

As discussed *supra*, more than one light treatment could be concurrently delivered (See **FIGS. 1-3**). **FIG. 13** shows an example of a toothpick **1300** with a handle **1310** and a transparent element **1320**. The exemplary toothpick **1300** is capable of engaging two light sources **1330, 1340** each with a unique light beam and light treatment **1332, 1342**. Each light source **1330, 1340** is optically connected to transparent element **1320**. Furthermore, transparent element **1320** could include optical guides **1350, 1360** to promote the propagation of each light beam **1332, 1342**.

FIG. 14 shows a cradle **1410** that can be used to store the toothpick **1412**. Cradle **1410** could also be used as a power supply (re)-charging device. Cradle **1410** could include a selection means **1430** for a user to select the hygienic effect(s) or treatment parameter(s) related to the unique hygienic effect(s). Selection means **1430** could be a selection means with, for instance, four arrow buttons **1432** and one center button **1434**. Each arrow button **1432** corresponds to a function or selection that could be selected from a displaying means **1420**. The up, down, left and right arrow buttons could relate to the browsing or selection from displaying means **1420**. Displaying means **1420** could be any type or size of displaying means that would fit the cradle and is useful to the user. Necessary software and hardware components would be included to provide the functionality to display the parameters, selections and/or functions as well as provide functionality to the buttons. Center button **1434** could be used as the enter button to confirm a selection as is common in the art. The cradle could include different variations of a selection means and is not limited to the selection means shown by **1430**.

Cradle **1410** could also include a slot **1440** for a read/writer card **1450** to read or write data. Examples of read/writer card **1450** are for instance a memory stick, compact flash card, smart media card, secure digital card, multi media card, microdrive or the like, which are common in the art. Read/writer card **1450** can upload information to the toothpick, store information from the toothpick, and could be interactively used with any type of hygienic service provider as described *infra*.

FIG. 15 shows a toothpick **1500** positioned in a cradle **1510** that could communicate **1520** with a hygienic service provider **1530**. Hygienic service provider **1530** includes a cell phone **1540**, a personal digital assistant, a Pocket PC or a handheld communication device (all three shown by **1550**), a computer **1560**, an Internet website **1570** or a professional service **1580** (e.g. a dentist, a medical doctor, a pharmaceutical company, medical company, or the like). The hygienic service provider **1530** provides information related to the toothpick **1500** that could be communicated **1520** back and forth between toothpick **1500** and hygienic service provider **1530**. Furthermore, the individual hygienic service providers **1530** could interact and communicate with each other **1525**. For instance, one could use Internet website **1570** and relay the data to cell phone **1540** before communicating with toothpick **1500**. Several different scenarios are possible and would provide flexibility to the user to obtain and provide data related to their hygienic treatment(s) that are used by toothpick **1500**. The communications means that could be used includes any wireless or wired communication means as common and available in the art. Furthermore, toothpick **1500** could include IR port, RF link, Bluetooth, phone line or Ethernet port or any type of wireless or wired communication means (shown by **1590**) suitable to communication with hygienic service provider **1530**. Selection means **1595** could be used as a means to send data from toothpick **1500** to hygienic service provider **1530** in a similar fashion as the HotSync key on Personal Digital Assistants (PDAs). Read/writer card **1450** as shown in **FIG. 14** could also be used as communication means **1520**, **1525**.

The present invention has now been described in accordance with several exemplary embodiments, which are intended to be illustrative in all aspects, rather than restrictive. Thus, the present invention is capable of many variations in detailed implementation, which may be derived from the description contained herein by a person of ordinary skill in the art. In one variation as shown in **FIG. 16**, a floss **1610**, e.g. a dental floss, could be added to a toothpick **1600** of the present invention. The floss could for instance be added at the bottom of a handle **1620**, however it could also be added to the side of handle **1620**. The floss is kept in place for instance by a soft plastic or any other holder mechanism **1630** as common in the art. The floss could be optically connected **1650** to a light source **1640**, by similar means as discussed *supra* for the optical connection between the light source and the element. This could be a separate light source with its own control or could be the same light source as for the element. In case a different light source is used for the floss, there is a choice whether the same or a different light treatment for the floss could be used compared to the light treatment for the element. In any event, the floss would glow when illuminated by a light beam from light source **1640**.

In another variation an agent could be used and applied to the body structures before, during or after the application of the light treatment. Examples of agents are for instance bioprotective agents, photocatalyst, treatment gels or cream, soothing agents, skin permeation enhancers or the like (See, for instance, the following companies/products which are listed for purposes of illustration and should not be regarded as limiting to the invention: *Neova by Procyte Corp. www.procyte.com*; *Medicalia Inc. www.medicalia.com*; or *ESBA Laboratories Inc.*). Such agents could work as a catalyst, soother or enhancer to

the body structures. All such variations are considered to be within the scope and spirit of the present invention as defined by the following claims and their legal equivalents.

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